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09/755,826	01/04/2001	Charles W. Pearce	PEARCE 26	5388
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HITT GAINES, PC LSI Corporation PO BOX 832570 RICHARDSON, TX 75083			EXAMINER CHEN, JACK S J	
			ART UNIT 2813	PAPER NUMBER
			NOTIFICATION DATE 07/13/2007	DELIVERY MODE ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

docket@hittgaines.com

Office Action Summary

Application No.

09/755,826

Applicant(s)

PEARCE, CHARLES W.

Examiner

Jack Chen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|--|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date ____ | 6) <input type="checkbox"/> Other: ____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Re claims 1 and 11, the phrase “the lightly-doped source/drain region formed between **first and second isolation structures**” lacks antecedent basis. For example, the step(s) for forming the first and second isolation structures is lacking.

The remaining Claims 2-10 and 12-20 are rejected for depending from the above rejected claims.

For the purpose of patentability, these claims will be interpreted as best understood.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-8, 10-18 and 20 are rejected under 35 U.S.C. 102(b) as being anticipated by D’Anna et al., U.S./5,841,166.

Re claim 1, D'Anna et al. disclose a method of manufacturing a laterally diffused metal oxide semiconductor (LDMOS) device, which comprises forming a lightly-doped source/drain region 46 (fig. 3A) with only a first dopant (i.e., Arsenic, col. 2, lines 55-60), the lightly-doped source/drain region *formed* between first and second isolation structures 52/54 etc. (figs. 3A-3B; note: the phrase "the lightly-doped source/drain region formed between first and second isolation structures" does not imply an order. The purpose of antecedent language in claim construction is to provide definiteness to the claims under 35 USC 112(2). In the instant case, the antecedent language "the lightly-doped source/drain region formed between first and second isolation structures" merely identifies location of the lightly-doped source/drain. Accordingly, no order is necessarily implied by the use of antecedent language. Further in this regard, the claims must be given the broadest reasonable interpretation, in this case, that NO order to the claimed steps is required. Moreover, if Applicant wishes to claim a particular order to the steps, the claims must clearly point out and distinctly claim such an order); and creating a gate 58 (fig. 3B) over the lightly-doped source/drain region, see figs. 1A-4 and cols. 1-4 for more details.

Re claim 2, wherein forming includes forming a lightly-doped source/drain region with a first N-type dopant (col. 2, lines 56-60).

Re claim 3, wherein the first N-type dopant has an implant dose ranging from about $1\text{E}12$ atoms/cm.² to about $1\text{E}13$ atoms/cm.² (i.e., $5\text{E}12$ col. 2, lines 56-60).

Re claim 4, wherein the first N-type dopant has an implant dose of about $5\text{E}12$ atoms/cm.² (i.e., $5\text{E}12$ col. 2, lines 56-60).

Re claim 5, further including diffusing a second dopant (i.e., boron; col. 3, lines 8-18) at least partially across the lightly-doped source/drain region and under the gate to form a first portion of a channel (fig. 3C).

Re claim 6, wherein diffusing the second dopant includes diffusing a P-type dopant having an implant dose ranging from about $1\text{E}13$ atoms/cm.² to about $1\text{E}14$ atoms/cm.² (i.e., $1\text{E}13$; col. 3, lines 8-18).

Re claim 7, wherein diffusing the second dopant includes diffusing a P-type dopant having an implant dose about 100 times higher than an implant dose of the first dopant (in this case, the p-type dopant having an implant dose of about $5\text{E}14$ and the first dopant of about $5\text{E}12$, also see col. 2, lines 56-60 and col. 3, lines 8-16).

Re claim 8, further including placing a heavy concentration of the first dopant (i.e., arsenic; col. 3, lines 16-18) in a region adjacent a source side of the gate (fig. 3D), and in the lightly-doped source/drain region adjacent a drain side of the gate (fig. 3D).

Re claim 10, wherein placing includes placing an implant dose of the first dopant ranging from about $1\text{E}15$ atoms/cm.² to about $1\text{E}16$ atoms/cm.² (i.e., $1\text{E}15$ - $1\text{E}16$; col. 3, lines 16-18).

Re claim 11, D'Anna et al. disclose a method of manufacturing an integrated circuit, comprising: fabricating laterally diffused metal oxide semiconductor (LDMOS) transistors (i.e., col. 1, lines 5-10), including: forming a lightly-doped source/drain region 46 (fig. 3A) with only a first dopant (i.e., Arsenic, col. 2, lines 55-60), the lightly-doped source/drain region formed between first and second isolation structures 52/54 etc. (figs. 3A-3B; note: the phrase "the lightly-doped source/drain region formed between first and second isolation structures" does not

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imply an order. The purpose of antecedent language in claim construction is to provide definiteness to the claims under 35 USC 112(2). In the instant case, the antecedent language “the lightly-doped source/drain region formed between first and second isolation structures” merely identifies location of the lightly-doped source/drain. Accordingly, no order is necessarily implied by the use of antecedent language. Further in this regard, the claims must be given the broadest reasonable interpretation, in this case, that NO order to the claimed steps is required. Moreover, if Applicant wishes to claim a particular order to the steps, the claims must clearly point out and distinctly claim such an order); and creating a gate 58 (fig. 3B) over the lightly-doped source/drain region; depositing interlevel dielectric layers (fig. 3D; col. 3, lines 19-28) over the LDMOS transistors; and creating interconnect structures (i.e., source contact, drain contact etc.) in the interlevel dielectric layers and interconnecting the LDMOS transistors to form an operative-integrated circuit (figs. 3D-4; col. 3, lines 19-55), see figs. 1A-4 and cols. 1-4 for more details.

Re claim 12, wherein forming includes forming a lightly-doped source/drain region with a first N-type dopant (col. 2, lines 56-60).

Re claim 13, wherein the first N-type dopant has an implant dose ranging from about $1E12$ atoms/cm.^{sup.2} to about $1E13$ atoms/cm.^{sup.2} (i.e., 5E12 col. 2, lines 56-60).

Re claim 14, wherein the first N-type dopant has an implant dose of about $5E12$ atoms/cm.^{sup.2} (i.e., 5E12 col. 2, lines 56-60).

Re claim 15, further including diffusing a second dopant (i.e., boron; col. 3, lines 8-18) at least partially across the lightly-doped source/drain region and under the gate to form a first portion of a channel (fig. 3C).

Re claim 16, wherein diffusing the second dopant includes diffusing a P-type dopant having an implant dose ranging from about $1\text{E}13$ atoms/cm.² to about $1\text{E}14$ atoms/cm.² (i.e., $1\text{E}13$; col. 3, lines 8-18).

Re claim 17, wherein diffusing the second dopant includes diffusing a P-type dopant having an implant dose about 100 times higher than an implant dose of the first dopant (in this case, the p-type dopant having an implant dose of about $5\text{E}14$ and the first dopant of about $5\text{E}12$, also see col. 2, lines 56-60 and col. 3, lines 8-16).

Re claim 18, further including placing a heavy concentration of the first dopant (i.e., arsenic; col. 3, lines 16-18) in a region adjacent a source side of the gate (fig. 3D), and in the lightly-doped source/drain region adjacent a drain side of the gate (fig. 3D).

Re claim 20, wherein placing includes placing an implant dose of the first dopant ranging from about $1\text{E}15$ atoms/cm.² to about $1\text{E}16$ atoms/cm.² (i.e., $1\text{E}15$ - $1\text{E}16$; col. 3, lines 16-18).

5. Claims 1-3 and 11-13 are rejected under 35 U.S.C. 102(b) as being anticipated by Kosiak et al., U.S./4,918,026.

Re claim 1, Kosiak et al. disclose a method of manufacturing a laterally diffused metal oxide semiconductor (LDMOS) device, which comprises forming a lightly-doped source/drain region 114 (figs. 1 and 2B; col. 2, lines 63-66) with only a first dopant (i.e., phosphorous, col. 4, lines 32-39), the lightly-doped source/drain region formed between first and second isolation structures 50/120 etc. (fig. 1; note: the phrase “the lightly-doped source/drain region formed between first and second isolation structures” does not imply an order. The purpose of antecedent language in claim construction is to provide definiteness to the claims under 35 USC

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112(2). In the instant case, the antecedent language “the lightly-doped source/drain region formed between first and second isolation structures” merely identifies location of the lightly-doped source/drain. Accordingly, no order is necessarily implied by the use of antecedent language. Further in this regard, the claims must be given the broadest reasonable interpretation, in this case, that NO order to the claimed steps is required. Moreover, if Applicant wishes to claim a particular order to the steps, the claims must clearly point out and distinctly claim such an order); and creating a gate 118 (fig. 1) over the lightly-doped source/drain region, see figs. 1-2G and cols. 1-10 for more details.

Re claim 2, wherein forming includes forming a lightly-doped source/drain region with a first N-type dopant (col. 4, lines 32-39; i.e., phosphorus).

Re claim 3, wherein the first N-type dopant has an implant dose ranging from about $1\text{E}12$ atoms/cm.² to about $1\text{E}13$ atoms/cm.² (i.e., $4.5\text{E}12$, col. 4, lines 32-39).

Re claim 11, Kosiak et al. disclose a method of manufacturing an integrated circuit, comprising: fabricating laterally diffused metal oxide semiconductor (LDMOS) transistors (also see col. 3, line 63 to col. 4, line 10 regarding transistors), which includes forming a lightly-doped source/drain region 114 (figs. 1 and 2B; col. 2, lines 63-66) with only a first dopant (i.e., phosphorous, col. 4, lines 32-39), the lightly-doped source/drain region formed between first and second isolation structures 50/120 etc. (fig. 1; note: the phrase “the lightly-doped source/drain region formed between first and second isolation structures” does not imply an order. The purpose of antecedent language in claim construction is to provide definiteness to the claims under 35 USC 112(2). In the instant case, the antecedent language “the lightly-doped source/drain region formed between first and second isolation structures” merely identifies

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location of the lightly-doped source/drain. Accordingly, no order is necessarily implied by the use of antecedent language. Further in this regard, the claims must be given the broadest reasonable interpretation, in this case, that NO order to the claimed steps is required. Moreover, if Applicant wishes to claim a particular order to the steps, the claims must clearly point out and distinctly claim such an order); and creating a gate 118 (fig. 1) over the lightly-doped source/drain region; depositing interlevel dielectric layers (i.e., PSG, SOG, etc., col. 7, lines 30-62) over the LDMOS transistors; and creating interconnect structures (i.e., metal contacts, etc., col. 7, lines 30-62) in the interlevel dielectric layers and interconnecting the LDMOS transistors to form an operative-integrated circuit, see figs. 1-2G and cols. 1-10 for more details.

Re claim 12, wherein forming includes forming a lightly-doped source/drain region with a first N-type dopant (col. 4, lines 32-39; i.e., phosphorus).

Re claim 13, wherein the first N-type dopant has an implant dose ranging from about $1E12$ atoms/cm.² to about $1E13$ atoms/cm.² (i.e., $4.5E12$, col. 4, lines 32-39).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 9 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over D'Anna et al., U.S./5,841,166.

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D'Anna et al. disclosed in above, and in particular figs. 3C-4 show that there is distance/space between the drain N+ and the gate. However, D'Anna is silent to the range as recited in the instant claims 9 and 19. With respect to claimed ranges of the distance/space, absent evidence of disclosure of criticality for the range giving unexpected results are considered to involve routine optimization while has been held to be within the level of ordinary skill in the art. As noted in *In re Aller* 105 USPQ233, 255 (CCPA 1955), the selection of reaction parameters such as thickness, distance, temperature and concentration etc. would have been obvious. See also *In re Waite* 77 USPQ 586 (CCPA 1948); *In re Scherl* 70 USPQ 204 (CCPA 1946); *In re Irmischer* 66 USPQ 314 (CCPA 1945); *In re Norman* 66 USPQ 308 (CCPA 1945); *In re Swenson* 56 USPQ 372 (CCPA 1942); *In re Sola* 25 USPQ 433 (CCPA 1935); *In re Dreyfus* 24 USPQ 52 (CCPA 1934).

Therefore, the subject matter as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made to select any suitable distance in the method of D'Anna et al. in order to provide normal operation for the MOS under the high voltage.

Furthermore, the specification contains no disclosure of either the critical nature of the claimed process/arrangement (i.e. – the claimed ranges of the distance) or any unexpected results arising therefrom. Where patentability is said to be based upon particular chosen limitations or upon another variable recited in a claim, the Applicant must show that the chosen limitations are critical. *In re Woodruff*, 919 F.2d 1575, 1578 (Fed. Cir. 1990).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jack Chen whose telephone number is (571)272-1689. The examiner can normally be reached on Monday-Friday (8:00am-4:30pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl W. Whitehead can be reached on (571)272-1702. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Jack Chen
Primary Examiner
Art Unit 2813

July 8, 2007